

**MARISA CHRISTINA PALUCIS**

*Associate Professor*

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**EDUCATION**

- Nov 2014                    **Doctor of Philosophy**  
Earth and Planetary Science, University of California – Berkeley  
Dissertation: *Using quantitative topographic analysis to understand the role of water on transport and deposition processes on crater walls*; Advisor: Professor William E. Dietrich
- May 2005                    **Bachelor of Science**  
Chemical Engineering (major) and Mathematics (minor), University of South Carolina - Columbia

**APPOINTMENTS**

- July 2024 – Current        **Associate Professor**  
Department of Earth Sciences, Dartmouth College
- July 2017 – June 2024     **Assistant Professor**  
Department of Earth Sciences, Dartmouth College
- Mar 2019 – Current        **Adjunct Professor**  
Department of Geosciences, University of Arkansas
- Nov 2015-June 2017       **NSF-EAR Postdoctoral Fellow**  
Lamb Surface Processes Group, California Institute of Technology, Pasadena, CA
- Nov 2014-Oct 2015        **Postdoctoral Researcher – Geology Fellowship**  
Lamb Surface Processes Group, California Institute of Technology, Pasadena, CA
- Sept 2008 – Aug 2014     **Graduate Researcher**  
Dietrich Geomorphology Group, Earth and Planetary Science, UC Berkeley, Berkeley, CA
- Sept 2005 – Aug 2008     **NSF Graduate Research Fellow**  
Kirchner and Dietrich Group, Earth and Planetary Science, UC Berkeley, Berkeley, CA

**AWARDS AND HONORS**

- 2024-2025                    Douglas C. Floren Fellowship for 2024 - 2025
- 2024                            The 2024 Karen E. Wetterhahn Memorial Award for Distinguished Creative or Scholarly Achievement
- 2021                            NASA Planetary Science Early Career Award
- 2015                            NSF-EAR Postdoctoral Fellowship Recipient
- 2014                            Caltech Postdoctoral Department Fellowship Recipient (Geology Section)
- 2012                            GSA Graduate Student Grant Recipient
- 2011                            Phil Behrman Graduate Student Field Studies Support Fund Recipient
- 2010                            Barringer Family Fund for Meteorite Impact Research Recipient, National Center for Airborne Laser Mapping (NCALM) Seed Grant Recipient
- 2008                            Outstanding Graduate Student Instructor Award, UC Berkeley
- 2005                            Tau Beta Pi Engineering Scholar

2001-2005

South Carolina Honors College Scholarship, University Scholars Scholarship

### AWARDED RESEARCH GRANTS

**1/1/2025 – 12/31/2025 NSF-CHIRRP-#####** Planning: CHIRRP: Strengthening Community Resilience to Flood Hazards in Rural NH and VT, \$199,998 to Dartmouth, Co-I

**9/1/2024 – 8/31/27 NASA-MDAP - #####**, Investigating controls on alluvial fan formation, \$221,607 to Dartmouth, Co-I (Dartmouth PI)

**10/1/2023 – 9/30/26 NASA-Exobiology-80NSSC23K1353** Toward predictive mapping of biosignatures across extreme aridity and salinity gradients in the Atacama Desert: A modern-day Mars analog, \$675,191 total to Dartmouth, Lead PI

**9/01/2023 – 8/31/2025 NSF-CSSI-2311319** Elements: A toolchain for efficient and reproducible analysis of permafrost landscape features, \$393,758 total (\$52,173 to Dartmouth), Co-I

**6/1/2022 – 5/31/2026 NASA-ECA-80NSSC22K1131** Using flume studies to quantitatively assess planetary surface processes and paleoclimate, \$200,000 total (\$200,000 to Dartmouth), PI

**11/1/2021 – 10/31/2024 NASA-SWW- 80NSSC22K0131** Reconstructing basaltic sediment transport on Mars using terrestrial analogues, \$394,465 total (\$207,855 to Dartmouth), Co-I

**9/1/2021 – 8/31/2024 NASA-EPSCoR-80NSSC21M0329** Low-Temperature Comparative Planetology: Pore-Scale Dynamics with Planetary Scale Implications, \$750,000 total (\$450,000 to Dartmouth), Co-I

**1/1/2022 – 12/31/2024 NSF-OPP-ANS-2116471** Collaborative Research: Watershed-scale geomorphic response to climate change in the Aklavik Range, NWT (Canada), \$777,758 total (\$520,231 to Dartmouth), Lead PI

**8/1/2021 – 7/31/2023 NASA-MDAP-80NSSC21K1100** Conglomerates in Gale crater, Mars: Sedimentary archives of martian paleohydrology and paleoclimate, \$247,360 total (\$52,069 to Dartmouth), Co-I

**6/1/2021 – 5/31/2023 NASA-MDAP-80NSSC21K1097** Do delta deposits around the crustal dichotomy record an ancient martian northern ocean?, \$277,593 total (\$209,027 to Dartmouth), Lead PI

**9/1/2020 – 8/31/2022 NASA-SSW-80NSSC21K0184** Linking alluvial fan morphology and sedimentology with formation processes via Martian analog studies in the Atacama Desert, Chile, \$263,661 total (\$86,280 to Dartmouth), Co-I

**2/22/19 – 2/21/22 NASA-SSW-80NSSC19K0539** How much water does it take to build a fan under a “cold and icy” Mars climate scenario?, \$343,160 total, Lead PI

**2021 Dartmouth Neukom Institute for Computational Science**, Snap, Crackle, Pop: Quantifying Frost Cracking in the Arctic; \$25,000 total, Lead PI

**2019 Dartmouth Neukom Institute for Computational Science**, Seeing through the forest: LiDAR drones, \$40,000 total, Lead PI

**11/1/2015 – 10/31/2017 NSF-EAR-GEO-1452337**, Experimental tests aimed at understanding debris flow initiation from runoff, \$174,000 total, PI

### PUBLICATIONS

\* = indicates graduate student / post-doc advisee

\*\* = indicates undergraduate or post-bac advisee

30. Landis JD, Obrist D, Zhou J, Renshaw C, **Palucis MC**, Del Vecchio J, McDowell WH, Nytech CJ, and Montano F, Quantitative accumulation of atmospheric Hg in forest soils, *Nature Communications*, accepted.
29. \*Lutz K, Hawley R, and **Palucis MC**, Quantifying the relationship between katabatic winds and spiral trough morphology on the martian north polar layered deposits, *JGR – Planets*, 129 (2), e2023JE008015.
28. \*Del Vecchio J, **Palucis MC**, and Meyer C, Permafrost extent sets drainage density in the Arctic, 2023, *Proceedings of the National Academy of Sciences*, 121 (6), e2307072120, <https://doi.org/10.1073/pnas.2307072120>.
27. \*Del Vecchio J, Swieback S, Rowland J, Dibiasi R, and **Palucis MC**, 2023, Hillslope-channel coupling in a changing permafrost landscape: the critical role of water tracks, *Journal of Geophysical Research - Earth Surface*, 128, <https://doi.org/10.1029/2023JF007156>.
26. **Palucis MC**, Kring DA, Howard A, Nishiizumi K, Caffee M, and Dietrich WE, 2023, The runoff required to drive post-impact gully development on the walls of Meteor Crater (Arizona, USA), *GSA Bulletin*, <https://doi.org/10.1130/B36863.1>
25. Buffo JJ, Ojha L, Meyer CR, Ferrier K, and **Palucis MC**, 2022, Revisiting Subglacial Hydrology as an Origin for Mars' Valley Networks, *Earth and Planetary Science Letters*, Vol 594, <https://doi.org/10.1016/j.epsl.2022.117699>.
24. **Palucis MC**, Morgan AM, \*Rivera-Hernandez F, Marshall J, \*Menio E, \*\*Miller R, and Strauss JV, 2022, Rates and processes controlling periglacial alluvial fan formation: Implications for martian fans, *GSA Bulletin*, <https://doi.org/10.1130/B36459.1>.
23. Harris CM, \*Maclay MT, \*Lutz K, Nathan V, \*Ortega Dominguez N, Leavitt WD, and **Palucis MC**, 2022, Remote and In-situ Characterization of Mars Analogs: Coupling Scales to Improve the Search for Microbial Signatures on Mars, *Frontiers in Astronomy and Space Science*, <https://doi.org/10.3389/fspas.2022.849078>
22. \*Putnam A and **Palucis MC**, 2021, The Hydrogeomorphic History of Garu Crater: Implications and Constraints on the Timing of Large Late-Stage Lakes in the Gale Crater Region, *JGR-Planets*, 126(5), 10.1029/2020JE006688.
21. \*Roseborough V, Horvath D, and **Palucis MC**, 2021, Was Gale Crater Connected to a Regionally Extensive Groundwater System?, *Geophys. Res. Lett.*, 48(6), 10.1029/2020GL092107
20. **Palucis MC**, \*\*Ulizio T, and Lamb MP, 2021, Testing hypotheses for wildfire-induced debris flows in steep bedrock landscapes using field data from the San Gabriel Mountains, *GSA Bulletin*, <https://doi.org/10.1130/B35822.1>
19. **Palucis MC**, \*\*Garczynski B, Jasper J, and Dietrich WE, 2020, Quantitative assessment of uncertainties in crater retention ages on small surface areas, *Icarus*, 341, [doi.org/10.1016/j.icarus.2020.113623](https://doi.org/10.1016/j.icarus.2020.113623).
18. \*Rivera-Hernandez F, **Palucis MC**, 2019, Do deltas along the crustal dichotomy boundary of Mars in the Gale Crater region record a northern ocean?, *Geophys. Res. Lett.*, [doi: 10.1029/2019GL083046](https://doi.org/10.1029/2019GL083046).
17. **Palucis MC**, \*Ulizio T, Fuller B, and Lamb MP, 2018, Intense granular sheet flow in steep river experiments, *Geophys. Res. Lett.*, [doi: 10.1029/2018GL077526](https://doi.org/10.1029/2018GL077526).
16. **Palucis MC**, \*Ulizio T, Fuller B, and Lamb MP, 2018, Flow resistance, sediment transport, and bedform development in a steep gravel-bedded river flume, *Geomorphology*, [doi: 10.1016/j.geomorph.2018.08.003](https://doi.org/10.1016/j.geomorph.2018.08.003).
15. Prancevic J, Lamb MP, **Palucis MC**, and Venditti J, 2017, The role of three-dimensional boundary stresses in limiting the initiation and size of experimental landslides, *JGR – Earth Surface*, [doi: 1002/2017JF004410](https://doi.org/10.1002/2017JF004410).
14. **Palucis MC** and Lamb MP, 2017, What controls channel form in steep mountain streams?, *Geophys. Res. Lett.*, 44, [doi: 10.1002/2017GL074198](https://doi.org/10.1002/2017GL074198).

13. Edgar LA, Gupta S, Rubin DM, Lewis KW, Kocurek GA, Anderson RB, Bell JF, Dromart G, Edgett KS, Grotzinger JP, Hardgrove C, Kah LC, Leveille R, Malin MC, Mangold N, Milliken RE, Minitti M, **Palucis MC**, Rice M, Rowland SK, Scheiber J, Stack KM, Sumner DY, Wiens RC, Williams RME, and Williams AJ, 2017, Shaler: In-situ analysis of a fluvial sedimentary deposit on Mars, *Sedimentology*, 65(1), 96-122, 10.1111/sed.12370.
12. Mangold, N, Thompson LM, Forni O, Fabre C, Le Deit L, Wiens RC, Williams AJ, Williams RME, Anderson RB, Blaney DL, Calef F, Cousin A, Clegg SM, Dromart G, Dietrich WE, Edgett KS, Fisk MR, Gasnault O, Gellert R, Grotzinger JP, Kah L, Le Mouelic S, McLennan SM, Maurice S, Meslin PY, Newsom HE, **Palucis MC**, Rapin W, Sautter V, Siebach KL, Stack K, Sumner D, and Yingst A, 2016, Composition of conglomerates analyzed by the Curiosity Rover: Implications for Gale crater crust and sediment sources, *JGR – Planets*, 121(3), 353-387, doi: 10.1002/2015JE004977.
11. **Palucis, MC**, Hayes AG, Williams RME, Sumner D, Mangold N, Horton N, Parker T, Lewis K, and Dietrich WE, 2016, Sequence and relative timing of large lakes in Gale Crater (Mars) after the formation of Mt. Sharp, *JGR – Planets*, doi: 10.1002/2015JE004905.
10. Kaitna R, **Palucis MC**, Yohannes B, Hill KM, and Dietrich WE, 2016, Effects of coarse grain size distribution and fine particle content on pore fluid pressure and shear behavior in experimental debris flows, *JGR – Earth Surface*, 121(2), 415-441, doi: 10.1002/2015JF003725.
9. Grotzinger JP, Gupta S, Rubin DM, Schieber J, Sumner D, Stack KM, Vasavada AR, Arvidson RE, Calef F, Edgar L, Fischer W, Grant JA, Kah LC, Lamb MP, Lewis KW, Mangold N, Minitti M, **Palucis MC**, Rice M, Siebach K, Williams RME, Yingst RA, Blake D, Blaney D, Conrad P, Crisp J, Dietrich WE, Dromart G, Edgett KS, Ewing RC, Gellert R, Griffes J, Hurowitz JA, Kocurek G, Mahaffy P, Malin MC, McBride M, McLennan SM, Mischna M, Ming D, Milliken R, Newsom H, Oehler D, Parker TJ, Vaniman D, Wiens R, and Wilson S, 2015, Deposition, Exhumation, and Paleoclimate of an Ancient Lake Deposit, Gale Crater, Mars, *Science*, 350(6257), 1-12, doi: 10.1126/science.aac7575.
8. Newsom HE, Mangold N, Kah LC, Williams JM, Arvidson RE, Stein N, Ollila AM, Bridges J, Schwenzer SP, King PL, Grant JA, Pinet P, Bridges NT, Calef F, Wiens RC, Spray JG, Vaniman DT, Elston WE, Berger J, Garvin JB, and **Palucis MC**, 2015, Gale crater and impact processes - Curiosity's first 364 Sols on Mars, *Icarus*, 249, 108-128, doi: 10.1016/j.icarus.2014.10.013.
7. **Palucis MC**, Dietrich WE, Hayes AG, Williams RME, Sumner D, Mangold N, Horton N, Gupta S, Calef F, and Hardgrove C, 2014, Origin and Evolution of the Peace Vallis fan system that drains to the Curiosity landing site, *J. Geophys. Res., Planets*, 119(4), 705-728, doi: 10.1002/2013JE004583.
6. Hamilton VE, Vasavada AR, Sebastian E, Armiens C, De la Torre M, Ramos M, **Palucis MC**, Lemmon MT, Rafkin SCR, Carrasci I, Gomez-Elvira J, Christen PR, Goetz W, Madsen MB, Yingst RA, Richardson MR, De Pablo MA, Martinez-Frias J, Martin-Torres FJ, Zorzano-Mier MP, and the MSL Team, 2014, Observations and science results from the first 100 sols of MSL REMS ground temperature sensor measurements at Gale Crater, *J. Geophys. Res. Planets*, 119(4), 745-770, doi: 10.1002/2013JE004520.
5. Grotzinger, JP, Sumner DY, Kah LC, Stack K, Gupta S, Edgar L, Rubin D, Lewis K, Schieber J, Mangold N, Milliken R, Conrad PG, DesMarais D, Farmer J, Siebach K, Calef III F, Hurowitz J, McLennan SM, Ming D, Vaniman D, Crisp J, Vasavada A, Edgett KS, Malin M, Blake D, Gellert R, Mahaffy P, Wiens RC, Maurice S, Grant JA, Wilson S, Anderson RC, Beegle L, Arvidson R, Hallet B, Sletten RS, Rice M, Bell III J, Griffes J, Ehlmann B, Anderson RB, Bristow TF, Dietrich WE, Dromart G, Eigenbrode J, Fraeman A, Hardgrove C, Herkenhoff K, Jandura L, Kocurek G, Lee S, Leshin LA, Leveille R, Limonadi D, Maki J, McCloskey S, Meyer M, Minitti M, Newsom HE, Oehler D, Okon D, **Palucis MC**, Parker T, Rowland S, Schmidt M, Squyres S, Steele A, Stolper E, Summons R, Treiman A, Williams R, Yingst A, and MSL Science Team, 2014, A habitable fluvio-lacustrine environment at Yellowknife Bay, Gale Crater, Mars, *Science*, 343(6169), 1242777, doi:10.1126/science.1242777.
4. Yingst RA, Kah LC, **Palucis MC**, Williams RME, Garvin J, Bridges JC, Bridges N, Farmer J, Gasnault O, Goetz W, Hamilton VE, Hipkin V, Jensen JK, King PL, Koefoed A, Le Mouélic S, Madsen MB, Martinez Frias J, Maurice S, McCartney EM, Newsom H, Pariser O, Wiens RC, 2013, Characteristics of pebble and cobble-sized clasts along

the Curiosity rover traverse from Bradbury Landing to Rocknest, *J. Geophys. Res. Planets*, 118(11), 2361-2380, doi: 10.1002/2013JE004435.

3. Williams RME, Grotzinger JP, Dietrich WE, Gupta S, Sumner DY, Wiens RC, Mangold N, Malin MC, Edgett KS, Maurice S, Forni O, Gasnault O, Ollila A, Newsom HE, Dromart G, **Palucis MC**, Yingst RA, Anderson RB, Herkenhoff KE, Le Mouélic S, Goetz W, Madsen MB, Koefoed A, Jensen JK, Bridges JC, Schwenzer SP, Lewis KB, Stack KM, Rubin D, Kah LC, Bell JF, Farmer JD, Sullivan R, Van Beek T, Blaney DL, Pariser O, and Deen RG, 2013, Martian fluvial conglomerates at Gale crater, *Science*, Vol 340, 1068-1072, doi: 10.1126/science.1237317.

2. Godsey S, Aas W, Clair T, de Wit H, Fernandez I, Kahl J, Malcolm I, Neal C, Neal M, Nelson S, Norton S, **Palucis MC**, Skjelkvale BL, Soulsby C, Tetzlaff D and Kirchner J, 2010, Generality of fractal 1/f scaling in catchment tracer time series and its implications for catchment travel time distributions, *Hydrological Processes*, 24.

1. **Palucis MC**, Glowienka T, Van Brunt V, Ervin R, Chastain W, Kline R, and Lodal P, 2006, Prediction of flammability speciation for the lower alkanes, carboxylic acids, and esters, *Process Safety Progress*, 26(1), 4-9.

### BOOK CHAPTERS

3. Kaitna R, **Palucis MC**, Marra F, and Huggel, Chapter 5: Causes and Triggers (Advances in Debris Flow Science and Practice – Springer Books)

2. **Palucis MC** and Morgan AM, 2020, Extraterrestrial fluvial environments, *Treatise on Geomorphology*, 2<sup>nd</sup> edition.

1. Dietrich, WE, **Palucis MC**, Williams RME, Lewis KW, Rivera-Hernandez F, and Sumner DY, 2017, Fluvial gravels on Mars: Analysis and implications, *Gravel-bed rivers: Process and disasters*, p. 467.

### PUBLICATIONS IN PROGRESS

\* = indicates graduate student / post-doc advisee      \*\* = indicates undergraduate or post-bac advisee

Wilner JA, Nordin B, Getraer A, Gregoire R, Keller CB, Krishna M, Li J, McDannell KT, Pickell DJ, Rogers ER, **Palucis MC**, and Keller CB, Limits to timescale dependence in glacial erosion rates (*submitted*)

**Palucis MC** and \*del Vecchio J, Chapter 3: Extraterrestrial Granular Flows, (*in review for Erosion, Deposition and Weathering across the Solar System*, 4<sup>th</sup> Vol of Comparative Planetary Book Series – Elsevier Books)

\*Ortega-Dominguez N, Horvath D, Morgan AM, Rivera-Hernandez F, and **Palucis MC**, Timing and source of water supporting early lakes in the Xanthe Terra region of Mars (*in prep for JGR:Planets*)

**Palucis MC**, Landis J, \*Pease G, and \*Del Vecchio J, Use of multiple fallout radionuclides (FRNs) to interrogate rates and modes of erosion in periglacial landscapes (*in prep for ESPL*)

**Palucis MC**, Modeling the precipitation-runoff required to carve gullies on the walls of Meteor Crater (Arizona, USA) by debris flows: Implications for martian gully formation (*in prep for GRL*)

### INVITED TALKS

30. **Palucis MC**, Mars on Earth: Using terrestrial landscapes to quantify rates and processes controlling martian landscape evolution, the 40<sup>th</sup> annual Gilbert Club, Berkeley, CA, 16 December 2023.

29. **Palucis MC**, Mars on Earth: Using terrestrial landscapes to quantify the role of climate change on sediment transport rates and processes, presented at University of Illinois – Urbana-Champaign, 30 November 2023.

28. **Palucis MC**, Mars on Earth: Using terrestrial landscapes to quantify the role of climate change on sediment transport rates and processes, presented at Colby College, 17 November 2023.

27. **Palucis MC**, Mars on Earth: Using terrestrial landscapes to quantify the role of climate change on sediment transport rates and processes, presented at Williams College, 27 September 2023.
26. **Palucis MC**, Estimating Landscape-Scale Water Budgets for Mars Analogs, PLENARY: Future Science: NASA's Early Career Award Winners, presented at the Lunar and Planetary Science Conference 54, March 13-17 2023
25. **Palucis MC**, Sediment production and transport processes in an arctic watershed undergoing climate change, presented at EGU Spring Meeting – Vienna, Austria, 23-27 May 2022.
24. **Palucis MC**, Geomorphic response to climate change in the Arctic: Implications for early Mars, presented at Rice University, 4 November 2021.
23. **Palucis MC**, Geomorphic response to climate change in the Arctic: Implications for early Mars, presented at UT Austin, 7 October 2021.
22. **Palucis MC**, Geomorphic response to climate change in the Arctic: Implications for early Mars, presented at Iowa State, 28 September 2021.
21. **Palucis MC**, The Martian Chronicles: There will come a Gale, presented at EPSP Connects, 18 August 2021.
20. **Palucis MC**, The sedimentology and geomorphology of Garu Crater: Implications and constraints on the timing of large late-stage lakes in the Gale Crater region, presented at GSA Fall Meeting Online, 26 – 30 October 2020.
19. **Palucis MC**, How much water does it take to build a fan on a cold and wet Mars?, presented at Purdue University, 8 October 2020.
18. **Palucis MC**, How much water does it take to build a fan on a cold and wet Mars?, presented at the University of Illinois at Chicago, 13 February 2020.
17. **Palucis MC**, Probing the fluvial to debris flow transition in steep streams, presented at University of Washington - Quaternary Research Center, Distinguished Lecture, 2 May 2019.
16. **Palucis MC**, From pebbles to landscapes: Reconstructing ancient environments on Mars, presented at Steepest Descent 2019, 13 April 2019.
15. **Palucis MC**, Extent and timing of hydrologic activity in the Gale Crater region of Mars, presented at University of Basel's department colloquia, 5 April 2019.
14. **Palucis MC**, Extent and timing of hydrologic activity in the Gale Crater region of Mars, Keynote Speaker in Planetary Geomorphology session, presented at EGU Spring Meeting – Vienna, Austria, 8-12 April 2019.
13. **Palucis MC**, Granular sheetflow at steep slopes, presented at EGU Spring Meeting – Vienna, Austria, 8-12 April 2019.
12. **Palucis MC**, Probing the fluvial to debris flow transition in steep streams, presented at University of Massachusetts – Amherst's department colloquia, 30 November 2018.
11. **Palucis, MC**, Geomorphic evidence for large lake basins in the Gale Crater region, presented at GSA Fall Meeting – Indianapolis, IN, 4-7 November 2018.
10. **Palucis, MC**, Flow resistance, sediment transport, and bedform development in a steep, gravel-bedded flume, presented at GSA Fall Meeting – Indianapolis, IN, 4-7 November 2018.
9. **Palucis, MC**, A hop, skip, and a jump: How sediment transport processes shape planetary surfaces, presented at Brown's Planetary Science seminar – Providence, RI, 19 October 2017.

8. **Palucis, MC**, Sediment transport: The key to linking climate and landscape evolution, presented at Oregon State University's College of Earth, Ocean, and Atmospheric Science – Corvallis, OR, 21 April 2016.
7. **Palucis, MC**, Using landforms to reconstruct past hydrologic conditions on Earth and Mars, presented at UC Santa Cruz's Department of Earth and Planetary Science – Santa Cruz, CA, 9 Feb 2016.
6. **Palucis, MC**, Using landforms to reconstruct past hydrologic conditions on Earth and Mars, presented at Dartmouth College's Department of Earth Science – Hanover, NH, 4 Feb 2016.
5. **Palucis, MC**, Hayes AG, Williams RME, Parker T and Dietrich WE, Lakes, Fans, Deltas, and Streams: Geomorphic constraints on the hydrologic history of Gale Crater, Mars, presented at the SETI Institute – Mountain View, CA, 12 May 2015 ( <https://www.youtube.com/watch?v=xq65TVKDZXS>)
4. **Palucis, MC**, How much water does it take to make a fan: Awkward questions Mars forces us to ask, presented at ASU School of Earth and Space Exploration – Tempe, AZ, 23 Feb 2015.
3. **Palucis MC**, Hayes AG, Williams RME, Sumner D, Mangold N, Horton N, Gupta S, Calef F, and Hardgrove C (2013) Geomorphic constraints of the geologic history of Gale Crater, Abstract P21D-01, presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec.
2. **Palucis MC**, Hayes AG, Williams RME, Sumner D, Mangold N, Horton N, Gupta S, Calef F, and Hardgrove C, Gaining insight on past climates using geomorphic constraints, presented at USGS – Menlo Park, 21 Nov 2013.
1. **Palucis MC**, Dietrich WE, Howard A, Nishiizumi K and Kring DA (2013) Meteor Crater: A test bed for processes on Mars, presented at the Barringer Family Company Annual Meeting, Flagstaff, AZ, 29 June 2013.

#### CONFERENCE PRESENTATIONS

\* = indicates graduate student / post-doc advisee      \*\* = indicates undergraduate or post-bac advisee

Palucis MC, Landis J, \*Pease G, and \*Del Vecchio J, Using multiple short-lived fallout radionuclides (FRNs) to interrogate rates and modes of erosion in two periglacial landscapes, presented at the American Geophysical Union Conference, San Francisco, December 11-15 2023.

\*Nordin B, \*Getraer A, Marshall JM, Strauss JV, Palucis MC, A Multi-Chronometer Approach to Constrain Alluvial Fan Formation in the Northwest Territories, Canada, presented at the American Geophysical Union Conference, San Francisco, December 11-15 2023.

\*Getraer A, Nordin B, Strauss JV, Palucis MC, Permafrost landsliding driven by ongoing response to deglacial base level fall in the Aklavik Range, NWT, Canada, presented at the American Geophysical Union Conference, San Francisco, December 11-15 2023.

\*Rogers E, Ferrari GL, Janovyak JH, Craddock RA, Morgan AM, Palucis MC, Reconstructing Basaltic Sediment Transport Using Clast Morphometry, presented at the American Geophysical Union Conference, San Francisco, December 11-15 2023.

Palucis MC, Modeling the precipitation-runoff required to carve gullies on the walls of Meteor Crater (Arizona, USA) by debris flows, presented at the Geological Society of America Annual Meeting, Pittsburgh, PA, 15 – 18 October 2023.

\*Rogers E, Palucis MC, Morgan AM, Craddock RA, Benyshek E, and Richards IV DF, Reconstructing Basaltic Sediment Transport on Mars Using Terrestrial Analogs, presented at the Lunar and Planetary Science Conference 54, March 13-17 2023.

Gibson T, Rivera-Hernandez F, Palucis MC, Williams RME, Morgan AM, and Kah LC, Using Rounding to Reconstruct the Depositional and Transport Histories of Conglomerates in Gale Crater, Mars, presented at AGU Fall Meeting, Chicago, IL, 12 – 16 December 2022

\*Maclay M, Palucis MC, Casana JJ, and Fowler BK, Monitoring Bedrock Temperature, Weathering, and Erosion at Cannon Cliff in Franconia Notch State Park (NH), presented at AGU Fall Meeting, Chicago, IL, 12 – 16 December 2022

\*Del Vecchio J, Palucis MC, Meyer C and \*\*Risch R, Ground temperature sets drainage density in the Arctic, presented at AGU Fall Meeting, Chicago, IL, 12 – 16 December 2022

\*Lutz K, Hawley R, and Palucis MC, A Comprehensive Investigation into Modern-Day Surface Processes Across the Martian North Polar Layered Deposit Spiral Troughs, presented at AGU Fall Meeting, Chicago, IL, 12 – 16 December 2022.

Palucis MC, Marshall JA, and Strauss JV, Sediment production and transport processes in an arctic watershed-fan system undergoing climate change, presented at Geological Society of America Annual Meeting, Denver, CO, 9 – 12 October 2022.

Harris CM, \*Maclay MT, \*Lutz K, Nathan V, \*Ortega Dominguez N, Leavitt WD, and Palucis MC, Remote and In-situ Characterization of Mars Analogs: Coupling Scales to Improve the Search for Microbial Signatures on Mars, presented at Northeast Geobiology Symposium 2022, Cambridge, MA, 16 April 2022.

\*Lutz K, Hawley R, and Palucis MC, Investigating lateral ice transport mechanisms across troughs on the Martian North Polar Layered deposits, presented at AGU Fall Meeting, New Orleans, LA, 13 – 17 December 2021.

Palucis MC, Morgan AM, Strauss JV, \*Rivera-Hernandez F, Marshall J, \*Menio E, and \*\*Miller R, (2021) What do you call a martian who (still) likes fluvial deposits? An alluvial fan, presented at the Lunar and Planetary Science Virtual Conference 52, March 15-19 2021.

\*\*Ando J, \*Rivera-Hernandez F, and Palucis MC, (2021) Does the Morphology of Alluvial Fan Drainage Basins Reflect their Climate?: A Case Study of Terrestrial Basaltic fans, presented at the Lunar and Planetary Science Virtual Conference 52, March 15-19 2021.

Palucis MC, \*Roseborough T, and Horvath D (2020), Geomorphic constraints on a regionally extensive groundwater system in the Gale Crater region, presented at AGU Fall Meeting Online, 1 – 17 December 2020.

Palucis MC, \*\*Stroud M, and Morgan AM (2020) Crater rim geometry controls on alluvial fan formation on Mars: Implications for constraining global climate in the late-Hesperian to early Amazonian, presented at GSA Fall Meeting Online, 26 – 30 October 2020.

Palucis MC, \*\*Stroud M, and Morgan A (2019) Topographic constraints on alluvial fan formation on Mars, presented at the 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.

\*\*Kanine M, \*Putnam A, Horvath D, \*Rivera-Hernandez F, and Palucis MC (2019) Quantitative Geomorphic and Hydrologic Evidence of Paleolakes on the Martian Crustal Dichotomy, presented at the 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.

\*\*Berkow Z, McKeon R, and Palucis MC (2019), A Maine mystery: Inferring patterns of landscape evolution in the northern Appalachians, presented at the 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.

\*\*Wagner D, \*Rivera-Hernandez F, and Palucis MC (2019) Characterizing surface roughness on periglacial alluvial fans in the Aklavik Range, NWT, as an analog for cold and icy martian fans, presented at the 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.



\*Putnam A and Palucis MC (2019) Are Hydrated Silica-Bearing Martian Deltas Evidence of Weathering during Transport or Post-depositional Alteration?, presented at the 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.

\*Rivera-Hernandez F, Strauss JV, Morgan AM, \*Menio E, Marshall J, and Palucis MC (2019) Periglacial fans in the Aklavik Range, Northwest Territories: An analog depositional environment for a cold and icy Mars, presented at the 2019 Fall Meeting, AGU, San Francisco, CA, 9-13 Dec.

Palucis MC, Strauss JV, \*Rivera-Hernandez F, Morgan AM, \*Menio E, Marshall J, (2019) How are fans built under a cold and icy Mars climate scenario, Paper No. 86-5, Geological Society of America Annual Meeting, Phoenix, AZ.

\*\*Kanine M, \*Putnam E, Horvath D, \*Rivera-Hernandez, and Palucis MC (2019) Quantitative geomorphic and hydrologic analysis of paleo-lake basins in the Gale crater region of Mars, presented at the Lunar and Planetary Science Conference 50, The Woodlands, Texas, 18-22 March.

\*Putnam E, \*\*Stroud M, and Palucis MC (2019) Mineralogy of Martian craters with alluvial fans versus those without: Insights into the controls on Martian alluvial fan distributions, presented at the Lunar and Planetary Science Conference 50, The Woodlands, Texas, 18-22 March.

\*Roseborough T, Horvath D, and Palucis MC (2019) Relative role of groundwater versus surface water in the Gale crater region, presented at the Lunar and Planetary Science Conference 50, The Woodlands, Texas, 18-22 March.

\*Rivera-Hernandez F and Palucis MC (2019) Alluvial fans in the Aklavik range, Northwest Territories: Analogs for fans in a cold and icy Mars scenario, presented at the Lunar and Planetary Science Conference 50, The Woodlands, Texas, 18-22 March.

\*Rivera-Hernandez F and Palucis MC (2018) Deltas along the crustal dichotomy of Mars likely record large lakes, not a global ocean, presented at the 2018 Fall Meeting, AGU, Washington, D.C., 10-14 Dec.

Palucis MC, \*Ulizio T, Fuller B, and Lamb MP (2018), Granular Sheetflow at Steep Slopes, Abstract EP41B-2648, presented at the 2018 Fall Meeting, AGU, Washington, DC, 10-14 Dec.

\*Rivera-Hernandez F, and Palucis MC (2018), Deltas along the crustal dichotomy of Mars likely record large lakes, not a global ocean, Abstract P31I-3821, presented at the 2018 Fall Meeting, AGU, Washington, DC, 10-14 Dec.

\*\*Berkow Z, McKeon R, and Palucis MC (2018), Inferring patterns of ongoing landscape evolution in the Northern Appalachians in New England (USA) using stream profile analysis, Abstract EP53E-1940, presented at the 2018 Fall Meeting, AGU, Washington, DC, 10-14 Dec.

Palucis MC, \*Garczynski B, Jasper J, and Dietrich WE (2018), Assessing the timing of hydrologic activity on Mars using a probabilistic cratering model, presented at the Lunar and Planetary Science Conference XLV, The Woodlands, Texas, 19-23 March.

Palucis MC, \*Ulizio T, Fuller B, and Lamb MP (2017) Flow resistance, sediment transport, and bedform development in a steep, gravel-bedded flume, Abstract 27243- 223858, presented at the 2017 Fall Meeting, AGU, New Orleans, LA, 12-16 Dec.

\*Zdeb B, Palucis MC, and Lamb MP (2016) Modeling In-Channel Debris Flow Initiation Pre- and Post-Fire within the San Gabriel Mountains, California, Abstract EP33D-1015, presented at the 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

\*Ulizio T, Fuller B, Palucis MC, and Lamb MP (2016) Flow resistance relationships and sediment transport in steep gravel-bed flume experiments, Abstract EP33D-1014, presented at the 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

Palucis MC and Lamb MP (2016) Bedform stability and in steep gravel bedded streams from field and flume data, Abstract EP32C-05, presented at the 2016 Fall Meeting, AGU, San Francisco, Calif., 12-16 Dec.

\*Holo S, Fuller B, Palucis MC, and Lamb MP (2015) Bulk Friction Angles in Dry, Drained, and Saturated Gravel Beds, Abstract EP53A-0956, presented at the 2015 Fall Meeting, AGU, San Francisco, Calif., 14-18 Dec.

Palucis MC, Dietrich WE, Howard A, Nishiizumi K, and Kring DA (2015) Meteor Crater: An analog for using landforms to reconstruct past hydrologic conditions, presented at 2015 Fall Meeting, AGU, San Francisco, Calif., 14-18 Dec.

Palucis MC, and Dietrich WE (2014) How small is too small? A model for assessing retention age uncertainties when dating small areas, Abstract 9044, presented at the Workshop on Issues in Crater Studies and Dating of Planetary Surfaces, Laurel, Maryland, APL-JHU, 19-22 May.

Palucis MC, Dietrich WE, Sumner D, Parker T, Williams RME, Hayes A, Mangold N, and Lewis K (2014) Quantitative topographic analysis as a guide to rover-based research on Mars, Abstract 28541, presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.

Dietrich WE, Palucis MC, Parker T, Rubin D, de Pablo MA, Oehler D, and Bridges DZ (2014) Looking towards Curiosity's canyon path: a 4 km sequence of gully, debris deposits, and fan/deltas which are bordered by a sloping bedform-capped plain and crossed by lake shorelines, to be presented at the Lunar and Planetary Science Conference XLV, The Woodlands, Texas, 17-21 March.

Palucis MC, Dietrich WE, Hayes AG, Williams RME, Calef F, Sumner D, Gupta S, Hardgrove C (2013) The origin and evolution of the Peace Vallis fan system, Paper No. 275-9, Geological Society of America Annual Meeting.

Palucis MC, Dietrich WE, Hayes AG, Williams RME, Calef F, Sumner D, Gupta S, Hardgrove C (2013) Origin and Evolution of the Peace Vallis fan system that drains to the Curiosity landing site, Gale Crater, presented at the Lunar and Planetary Science Conference XLIV, The Woodlands, Texas, 18-22 March

Williams RME, Dietrich WE, Grotzinger J, Gupta S, Malin MC, Palucis MC, Rubin D, Stack KM, Sumner DY, Yingst RA, Bridges JC, Goetz W, Koefoed A, Jensen JK, Madsen MB, Schwenzer SP, Deen RG, Pariser O, and the MSL Science Team (2103) Curiosity's Mastcam Images Reveal Conglomerate Outcrops with Water Transported Pebbles, presented at the Lunar and Planetary Science Conference XLIV, The Woodlands, Texas, 18-22 March

Dietrich WE, Palucis MC, Sanjeev G, Williams RME, Lewis K, Hayes AG, Sumner DY, and the MSL Team (2012) Alluvial fans near the Curiosity Landing Site, Paper No. 69-4, Geological Society of America Annual Meeting.

Palucis MC, Dietrich WE, Howard A, Nishiizumi K and Kring DA (2012) How much water is needed to make gullies on Mars: A conceptual model, presented at Lunar and Planetary Science Conference XLIII, The Woodlands, Texas, 19-23 March

Kaitna R, Palucis MC, Tewoldebrhan B, Hill KM, Dietrich WE (2011) The effect of fines and grain size distribution on pore fluid pressure, shear rate and bulk flow resistance in large scale experimental debris flows, Abstract EP31C-0832 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec

Kaitna R, Palucis MC, Yohannes B, Kill KM, Dietrich WE (2011) Effect of fines and grain size distribution on pore fluid pressure and velocity profiles in large scale experimental debris flows, in European Geosciences Union (Ed.). Geophysical Research Abstracts, Vol. 13, EGU2011-6312.

## **TEACHING EXPERIENCE**

### **Undergraduate**

EARS 67/167: Geomechanics (S19, W21, F22, W24; Instructor)

EARS 6: Environmental Change (F18; Co-Instructor)

EARS 33/GEOG 17.01: Earth Surface Processes and Landforms (S18, S20, S21, S24; Instructor)

EARS 65/165: Remote Sensing (W18, W20; Instructor)

The Planet Earth (S07; TA)  
 Fluid Flow and Heat Transfer Principles in Chemical Engineering (F07; TA)  
 Geomorphology (F09; TA)  
 The Water Planet (S11; Co-Instructor)  
 The Planets (S11; TA)  
 Case Studies in Earth and Planetary Systems (F10, F11; TA)

**Graduate**

EARS 145: Field pedagogy (F19, F21, F22, F23; Instructor)  
 EARS 202: Scientific Communication (W21, Co-Instructor)  
 EARS 203: Scientific Writing (S20, S24; Co-Instructor)  
 EARS 272: Topics in Historical Geobiology (F21, F23; Co-Instructor)  
 EARS 276: Topics in Earth Surface Processes (S19; Co-Instructor)  
 Fluvial Geomorphology (S11 and S14; TA)

**MENTORING**

**Supervised Undergraduate Theses**

Peter Blachford	in progress
Cameron Stewart	in progress
Kate Boydston	grad Dec 2022
Molly Stroud, Junior Fellow	grad June 2021
Kellen Appleton	grad. Dec 2020
Oak Kanine, EE Just Fellow	grad. June 2020
Zachary Berkow, Sophomore and Junior Fellow	grad. June 2020
Kyle Bretherton	grad. June 2020
Ana Colon, Mellon Mays Fellow	grad. June 2018
Audrey Putnam	grad. June 2018

**Supervised and Co-Supervised Graduate Theses**

Andrea Chen – MSc co-advisor	starting Fall 2024
Bavani Kathir – PhD advisor	starting Fall 2024
Bailey Nordin – MSc co-advisor	in progress
Alec Getraer – PhD advisor	in progress
Emma Rodgers – PhD advisor	in progress
Kathrine Lutz – MSc co-advisor / PhD advisor	in progress
Cory Hughes – PhD committee (Univ. of Arkansas)	in progress
Jordan Fields – PhD committee member	in progress
Carrie Harris – PhD committee member	in progress
Noemi Ortega Dominguez – MSc advisor	grad in Feb 2024
Matthew Maclay – MSc advisor	grad in Oct 2023
Gailin Pease - MSc committee member	grad in March 2022
Rebecca Rossi – MSc committee member	grad in Aug 2021
Torie Roseborough – MSc advisor	grad in Jun 2021
Audrey Putnam – MSc advisor	grad. in Aug 2020
Nate Anderson - MSc committee member	grad in May 2020
Mackenzie Marti – MSc committee member	grad. Jan 2018
Maura Roberts – MSc committee member	grad. Jan 2018

**Supervised Undergraduate Research**

2023 – 2024	Honor’s thesis advisor (Peter Blatchford; Cameron Stewart); Undergrad research advisor (Genevieve Ferrari)
2022 – 2023	Undergrad research advisor (Peter Blatchford; Genevieve Ferrari; Cameron Stewart); NASA SUPPR advisor (Jillian Janovyak)
2021 – 2022	Undergrad research advisor (Jordan Ando, Elise Donovan); Honor’s thesis advisor (Kate Boydston)

2020 – 2021 Undergrad research advisor (Jordan Ando, Kate Boydston), Presidential Scholar advisor (F20, Eli Boardman), Junior Scholar advisor (F20/W21, Kate Boydston), Stefansson Fellow advisor (W21, Virgil Alfred)

2019 – 2020 Undergrad research advisor (Virgil Alfred, Molly Stroud, Catherine Granville), NASA SUPPR advisor (Jordan Ando), Presidential Scholar advisor (X20, Eli Boardman), Junior Scholar advisor (X20, Kate Boydston)

2018-2019 WISP advisor (Andra Pantelimon), Mellon Mays Fellow (Hanover Vale)  
Undergrad research advisor (Molly Stroud, Kevin Gross, Catherine Granville), NASA SUPPR advisor (Diane Wagner)

Summer 2018 Undergraduate Research Advisor (Max Huffman, Hope College)

Summer 2016 Summer Undergraduate Research Fellowship Mentor (advisee: Brian Zdeb)

Summer 2015 Summer Undergraduate Research Fellowship Mentor (advisee: Samuel Holo)

## **PROFESSIONAL SERVICE**

### **Journal Reviewer**

Science

Nature Geoscience, Communications

Geology, GSA Bull.

Geophysical Research Letters

Journal of Geophysical Research – Planets

Journal of Geophysical Research – Earth Surface

Earth and Planetary Science Letters

Icarus

Geomorphology

### **Ad Hoc Reviewer and Panelist**

NASA FINESST

NASA Solar System Workings - GEO

NSF Geomorphology and Land-use Dynamics and Arctic Natural Sciences

NASA Earth and Space Science Fellowship Program

NASA Goddard IFSM Midway Review Panel

### **Conference Session Convener**

Session Chair, AGU Fall Meeting – Planetary Sediment Transport (2016, 2017, 2018, 2019, 2020, 2021, 2023)

Session Chair, AGU Fall Meeting – EPSP General Posters (2018, 2019, 2020)

Session Chair, GSA Fall Meeting – Planetary Geomorphology (2019, 2020, 2021)

Planning Committee, LPSC – Mars Geomorphology Section (2021, 2022)

Dwornik Award Chair, LPSC (2021)

### **Professional Societies and Service**

American Geophysical Union (Chair, Earth and Planetary Surface Process AGU Program Committee – 2020-2022;  
Member, Executive Committee, 2018 – present)

Geological Society of America (Planetary Geology Division Executive Board Member, 2019-2024)

European Geophysical Union (Member)

Dartmouth EARS Diversity, Inclusion, and Equality Committee (Member, 2020 – Summer 2022)

Unlearning Racism in Geosciences – Dartmouth Pod (2021)

Dartmouth Climate Initiative (2021)

Pellas-Ryder Award Committee (Member, 2021 – 2023)

EARS Department Seminar Planner (2022 – 2023 Academic Year)

Astronaut Candidate Training (ASCAN) Instructor, Surface Processes and Sedimentology (2022 – present)

### **Missions**

Collaborator, Mars Exploration Rovers (MER), 2016 – End of Mission

Science Team Member, MMM, Mars Science Laboratory (MSL), 2012 - 2017